# ORIGINAL

# Before the FEDERAL COMMUNICATIONS COMMISSION Washington, D.C. 20554



In the Matter of

Amendment of the Commission's Rules to Establish New Personal Communications Services GEN Docket No. 90-314 ET Docket No. 92-100

### COMMENTS OF NORTHERN TELECOM

Albert Halprin Stephen L. Goodman Halprin, Mendelsohn & Goodman 1301 K Street, N.W. Washington, D.C. 20005 (202) 371-9100

Counsel for Northern Telecom Inc.

John G. Lamb, Jr. Senior Counsel Northern Telecom Inc. 2100 Lakeside Boulevard Richardson, Texas 75082

RECEIVED

NOV - 9 1992

FEDERAL COMMUNICATIONS COMMISSION OFFICE OF THE SECRETARY

November 9, 1992

0+4

#### SUMMARY

In these comments, Northern Telecom addresses many of the issues that will be critical to the success of PCS. This filing sets forth the essential principles that we believe will be the basis on which the products and services can develop.

The amount of spectrum allocated to the service, and the amount assigned to each licensee, will be an important factor in the success of the PCS. Northern Telecom supports the Commission's proposal to allocate to each of three licensees 30 MHz of spectrum for licensed PCS services. The Commission's goal of competition will be assured because there will be intraservice competition amongst the PCS licensees, as well as interservice competition with cellular and SMR operators. Although it would be possible to divide the spectrum into more PCS licenses, any marginal additional competition would be more than offset by the technical and economic harm that would result from splintering the spectrum. In addition, because the PCS licensees must share spectrum with incumbent microwave users, we strongly support the Commission's proposal of 30 MHz of spectrum for each PCS licensee.

To ensure full interservice competition, Northern

Telecom also endorses the Commission's proposal that the cellular companies be allowed to provide a full range of PCS-like services on their current 800 MHz spectrum. These advanced services will put cellular companies on a "level playing field" with the PCS

licensees, and prevent cellular companies from being forced into regulated obsolescence.

Northern Telecom agrees that implementation of PCS requires flexibility in design, particularly at this early stage with still evolving services and concepts, and the need for the licensed operators to coexist with the incumbent users. PCS must therefore incorporate spectrum etiquette techniques that allow a maximum number of users and applications to exist in any geographic area, while providing a high grade of service and a minimum amount of interference, as well as common air interface standards that provide portability between service providers.

In addition, effective utilization of the spectrum assigned to each licensee and universality of PCS systems depend on the channelization scheme(s). Northern Telecom does not agree with the Commission proposal to allow the licensees the flexibility to channelize the blocks as they see fit. Northern Telecom believes a "base" channelization plan on which unique services can be built will permit each service to gain access to a maximum amount of spectrum. Northern Telecom includes in these comments a Spectrum Management Methodology (SMM), for use in the licensed bands, that will provide the necessary means to ensure interoperability and mobility among licensed systems, while preserving needed flexibility. SMM includes a "listen-beforetalk" protocol, common air interfaces, and beacon control channels.

Northern Telecom also recommends that PCS include common air interfaces (CAIs) for PCS products and services, which will lower production costs, encourage innovation and specialization, and focus developers' efforts on niche markets and unique applications, while also supporting competition, roaming and interoperability. CAIs across licensed and unlicensed PCS activities will have the additional benefit of allowing unlicensed PCS operations to serve as a catalyst for the widespread deployment of PCS.

Because of the benefits of mobility and accessibility that unlicensed PCS operations will provide, as well as its potential to speed the implementation of PCS, Northern Telecom supports the Commission's proposal to allocate spectrum to these services. Northern Telecom believes, however, that the Commission should allocate 35 MHz of spectrum initially, but allow for a "phased" implementation as the spectrum is "cleared" of incumbent microwave licensees. The spectrum must be cleared because the unlicensed PCS applications cannot operate with the incumbent users without potentially adversely affecting those users, or without threatening the mobility or ubiquity of PCS. In addition, the proposed 20 MHz allocation will quickly be exhausted, and thus should be increased by also allocating the adjacent 1895-1910 MHz band.

Northern Telecom also supports the Commission's proposal to allow cellular companies access to licensed PCS spectrum outside their service areas. Allowing cellular

companies into the PCS market place will enable them to take advantage of years of experience, technical knowledge, and existing billing systems. In a related vein, Northern Telecom views the technology used to deliver PCS as a cost effective alternative to copper and fiber technologies in many cases for local distribution. As such, the LECs must be able to compete to retain their customer base on a "level playing field." The LECs must have the opportunity to provide wireless loop services within their territories, either through a separate allocation or in the PCS bands, otherwise they will be relegated to a status of regulated obsolescence.

Northern Telecom also strongly believes that technical standards are required to ensure the ubiquity expected of PCS. The Commission should encourage standards that permit the same units to be used in both licensed and unlicensed applications. Northern Telecom agrees that a Commission advisory committee is not necessary at this time, due to the progress to date of the different industry fora. Northern Telecom urges the Commission to continue monitoring these standards setting activities, and directly intervene only if those efforts appear unlikely to be successful. Finally, Northern Telecom urges the Commission to modify somewhat its proposed coordination rules, and extrapolate the coordination distances to derive appropriate values for low-power (<1W) and low antenna (<15m) systems.

## Table of Contents

			<u>Page</u>
I.	INTE	RODUCTION	1
II.		CIENT SPECTRUM ALLOCATION IS CRUCIAL FOR MELY ROLL OUT AND MARKET ACCEPTANCE OF PCS	4
	Α.	Splitting The PCS Spectrum Fairly Will Determine The Diversity Of Licensed Services, And The Success Of The PCS Licensees	4
	В.	A Base Channelization Plan For The Spectrum Blocks And Common Air Interfaces For The Services Will Enable Innovative Applications To Be Developed And Deployed	8
	с.	Use Of The Services In The Unlicensed Bands Will Satisfy Important Needs As Well As Drive The Demand For PCS In The Licensed Bands, But Requires Clear Spectrum For Its Use	15
	D.	Additional Technical Considerations With Respect to Unlicensed Applications	19
III.	OF F	FORM OF REGULATION WILL AFFECT THE SUCCESS PCS IN MEETING THE COMMISSION'S GOAL OF THE EST RANGE OF SERVICES AT THE LOWEST COST	24
	Α.	Licensed PCS Providers Must Be Classified As Common Carriers To Provide The Services Their Customers Will Require	24
	В.	Fair Connection Into The Public Switched Telephone Network Is Crucial To The Success Of PCS	27
IV.	CARF THE	LULAR COMPANIES AND LOCAL EXCHANGE RIERS CAN INCREASE COMPETITION IN WIRELESS SERVICES MARKET, AND PROVIDE SERVICES IN A COST EFFECTIVE MANNER	28
	Α.	Cellular Companies Have Significant Experience In Providing Wireless Communications And Should Be Able To Offer PCS Outside Their Service Area	28

		В.	Allowing Cellular Companies To Offer PCS-Type Services On Their Current Spectrum Will Promote Competition In Service Areas .	29
		c.	Local Exchange Companies Must Be Able To Compete With New Technologies And Services For Their Existing Business	30
	v.	TECHI	NICAL STANDARDS	31
		A.	A Combination Of Technical Regulations And Industry Standards Are Required To Support Current And Future Applications For PCS	31
		В.	Interference And Coordination Guidelines That Allow Multiple Power And Distance Levels Will Encourage The Most Appropriate Installations In A Given Market	35
VI.	CONC	LUSIO	N	37

RECEIVED

# Before the FEDERAL COMMUNICATIONS COMMISSION Washington, D.C. 20554

NOV - 9 1992

FEDERAL COMMUNICATIONS COMMISSION OFFICE OF THE SECRETARY

In the Matter of

Amendment of the Commission's Rules to Establish New Personal Communications Services GEN Docket No. 90-314 ET Docket No. 92-100

### COMMENTS OF NORTHERN TELECOM

## I. <u>INTRODUCTION</u>

Northern Telecom is the leading global supplier, in 90 countries, of digital telecommunication switching systems, providing products and services to the telephone operating companies, governments, universities and other institutions worldwide. Northern Telecom has 57,000 employees and had revenues in 1991 of \$8.1 B. In February 1991, Northern Telecom established a wireless systems organization that has as its objective the development of new wireless technologies and services to meet marketplace demands throughout the world. In recognition of the growing importance of wireless communications, this group has been made comparable in organizational stature to

These comments present Northern Telecom's views on Personal Communication Services ("PCS") in response to the Notice of Proposed Rulemaking. These views are the results not only of research performed by Northern Telecom's in-house laboratory, BNR, but also reflect firsthand company experience with PCS in Europe, the United Kingdom, Canada and Pacific Rim countries. Northern Telecom's role as a world leader in manufacturing telecommunications equipment, combined with its actual experience with PCS throughout the world, makes it uniquely qualified to address the Commission's questions regarding PCS in this proceeding.

In this filing, Northern Telecom addresses the issues that will be critical to the success of PCS. Set forth below are the basic principles that the Commission should consider when adopting rules to govern PCS so that robust, successful services and products will develop in this country:

- Dividing the PCS spectrum fairly among different users and uses will determine the diversity of the service, and the success of the PCS licensees. The Commission should take into account both economic and technological considerations when allocating spectrum for PCS.
- Use of the services in the unlicensed bands for both residential and commercial applications will serve as an important catalyst to drive the demand for the service in the licensed band. In order to operate successfully and be able to provide ubiquity and mobility, however, the unlicensed

Amendment of the Commission's Rules to Establish New Personal Communications Services, GEN Docket No. 90-314, ET Docket No. 92-100, FCC 92-333, released August 14, 1992 (hereafter cited as "NPRM").

bands will require "clear" spectrum. Industry Associations are studying the best means to accomplish such a task for the unlicensed bands, and the Commission should monitor and support those activities.

- An allocation of at least 35 MHz for unlicensed applications will be necessary, although it may be possible to deploy equipment prior to the "clearing" of all of that spectrum if the point-to-point users are relocated out of sufficient portions of the bands allocated to unlicensed applications. Such a staged implementation will allow the rapid availability of these important unlicensed PCS services.
- Licensed PCS providers should be classified as common carriers to ensure the availability of service and to maximize interconnectivity, although extensive regulation will be unnecessary because of the existence of competition.
- Connection with the public switched telephone networks (PSTN) is crucial to the success of PCS, and the terms and conditions for such interconnection must be fair to both the PCS operators and the carriers.
- Cellular licensees have significant experience and expertise in providing wireless communications, which would enable them to initiate PCS service rapidly and efficiently, thereby enhancing competition and lowering rates to consumers. Therefore, those carriers should have the opportunity to obtain licenses to provide PCS services outside their cellular service territory.
- Cellular licensees should be provided the flexibility to offer a full range of mobile and fixed PCS-type services using their current spectrum, which will promote competition among the various wireless services.
- Local Exchange Carriers must be able to compete with new technologies and services for their existing business, and they should not be foreclosed from using wireless technologies to do so.
- Although flexibility for PCS operators is important, a base channelization plan that defines

the size of spectrum blocks for different services, designates beacon control channels and specifies common air interfaces for the services will foster interconnectivity and enable innovative applications to be developed on a ubiquitous system.

- A combination of a limited number of Commissionimposed technical regulations and industry
  standards will be necessary to support current and
  future applications for PCS. To the maximum
  extent possible, the Commission should allow the
  current standards setting activities to develop
  the needed industry standards. Northern Telecom
  presents a Spectrum Management Methodology that
  can be used to provide the necessary general
  guidelines and implement the appropriate
  standards, and allow services and standards to
  evolve over time.
- o Interference and coordination guidelines that take into account multiple power levels and distances will allow the most appropriate installations in a given market to be implemented.
- II. EFFICIENT SPECTRUM ALLOCATION IS CRUCIAL FOR A TIMELY ROLL OUT AND MARKET ACCEPTANCE OF PCS
  - A. Splitting The PCS Spectrum Fairly Will Determine The Diversity Of Licensed Services, And The Success Of The PCS Licensees

In the <u>Notice</u>, the Commission indicates that a goal of this proceeding is to provide an allocation that allows for the provision of the widest range of PCS services at the lowest cost to consumers. The Commission believes that PCS will also provide competition to current mobile radio services, such as cellular systems, thereby forcing every wireless service

 $<sup>\</sup>underline{^{2}}$  NPRM at ¶ 34.

 $<sup>\</sup>underline{^{3'}}$  NPRM at ¶ 26.

provider to improve quality and reduce costs, all to the benefit of the public. The Commission realizes, however, that it must necessarily restrict the size of any PCS allocation due to the limited amount of available spectrum. Balancing this constraint and the desire to ensure robust competition, the Commission tentatively concludes that a licensed allocation that provides sufficient spectrum to support a minimum of three PCS licensees per market will be necessary.44

Northern Telecom supports the Commission's suggestion of three PCS licenses for each market. In determining the number of PCS licenses for each market, the Commission should take into account the fact that each of the territories is currently supporting two cellular carriers, and many of the territories are also served by one or more SMR carriers. Thus, the three PCS licensees will face significant competition from not only the other PCS licensees, but also from additional wireless services, ensuring that the Commission's goal of vigorous competition is met.

(continued...)

 $<sup>^{4}</sup>$  NPRM at ¶ 34.

The PCS licensees additionally may face some degree of competition from mobile satellite services, including geostationary satellites and low-Earth orbit satellites.

In addition to the availability of significant competition, the Commission should consider that each PCS licensee will need to invest significant amounts of capital in order to deploy the PCS infrastructure, and to relocate the current point-to-point licensees. At least initially, before the service and market matures, excessive splintering of the market may make it difficult to attract the funds needed for the rapid

Moreover, in light of the limited amount of spectrum available, it would be necessary to assign relatively small blocks of spectrum to each of the licensees in order to ration the spectrum amongst numerous licensees in each market, thereby threatening the quality and diversity of service. In light of these technological and economic considerations, Northern Telecom believes that the market can support up to three PCS licensees and still provide a technologically robust service and an attractive investment opportunity. While additional competitors may offer marginally different solutions, they will fragment the market so that no licensee is assured of sufficient spectrum or adequate returns.

The amount of spectrum available to the service overall and to each PCS licensee will be a critical factor in the success of PCS. Spectrum blocks must be sufficiently large to support the multiple applications anticipated with PCS services, since some of the proposed services will require relatively wide bandwidths. In addition, blocks of spectrum that are too splintered will not allow the PCS operators to take advantage of scale economies and spectrum efficiencies. The Commission has indicated that an assignment to each PCS licensee of 30 MHz of spectrum at 2 GHz should be adequate to meet these goals. 21

<sup>6/(...</sup>continued)

implementation of PCS because of the added uncertainty of an adequate revenue stream in a "crowded" market.

 $<sup>\</sup>underline{NPRM}$  at ¶ 36.

Northern Telecom strongly supports the Commission's proposal of an assignment of 30 MHz of spectrum for each PCS licensee as specified in the NPRM. To some extent, the full amount of spectrum assigned to the PCS licensee may not be usable by that licensee for a period of time because of the need to accommodate sharing with incumbent microwave users in a manner that ensures that the PCS emissions do not interfere with the current point-to-point systems. In addition, 30 MHz is necessary for each PCS licensee to provide the capacity, quality and variety of voice, data and broadband services envisaged, some of which may consume 5 to 10 MHz for a single application. §

Finally, to encourage "interservice" competition,
Northern Telecom supports the Commission's proposal to allow the
cellular companies to provide a full range of mobile and fixed
PCS-like services in their current 800 MHz spectrum. These
advanced services will put cellular companies on a "level playing
field" with the PCS licensees, and thereby open up additional
competition in the wireless services markets. Under this
proposal, existing cellular companies will not be forced into
regulated obsolescence through artificial restrictions on the
services they can offer. The resulting broadened competition
will improve service quality and innovation for both PCS and

E.g., certain high speed mobile data service applications will require relatively wide bandwidths, although the low power of PCS will allow the spectrum to be reused frequently.

cellular, and should also lead to reduced prices for the consumer.

B. A Base Channelization Plan For The Spectrum Blocks And Common Air Interfaces For The Services Will Enable Innovative Applications To Be Developed And Deployed

The channelization scheme(s) adopted by the Commission for PCS will have a significant impact on the effective utilization of each spectrum block assigned to a licensee, quality of service, variety of service, and universality, interoperability and interconnectivity of PCS services. Thus, channelization is a critical parameter for the Commission to specify. The Commission, however, proposes to allow the licensed PCS operators complete freedom to channelize the blocks. While flexibility is an important consideration, Northern Telecom strongly urges the Commission to adopt a "base" channelization plan to ensure a necessary measure of uniformity, while still allowing the PCS operators a significant degree of flexibility.

Northern Telecom recognizes that flexibility of the PCS licensee to provide services their customers require is vital to the success of PCS services, and that the marketplace is a better determinant of service demand than the regulators. Northern Telecom is not advocating that the Commission engage in detailed

 $<sup>^{9&#</sup>x27;}$  NPRM, ¶ 38. For the unlicensed operations, the Commission has proposed a base channelization plan that Northern Telecom supports.

service definition or standards setting. However, Northern Telecom believes a base channelization plan on which unique services can be built will permit each service to gain access to a maximum amount of spectrum, and will foster interconnection and interoperability.

Northern Telecom envisions PCS as a part of a seamless web of wired and wireless networks, not as discrete, individual systems. A base channelization plan can preserve a significant degree of flexibility, while also accommodating variances in the relative demand for each service as the market evolves. In addition, a properly crafted base channelization plan, in conjunction with proper spectrum management techniques, can accommodate variances in demand for services between regions and facilitate the ease of movement of users between alternate service providers, thus making ubiquitous service possible.

For the PCS spectrum to be used efficiently as the service evolves over time, the base channelization plan must be designed not only to meet today's needs, but also to anticipate (and accommodate) future events such as new services, additions to allocated spectrum, regulatory changes in the competitive environment, additional licensees, and other unforeseen actions. Northern Telecom has included a proposed methodology for governing a channelization plan for licensed services, along with common air interfaces and spectrum etiquette techniques, called

the Spectrum Management Methodology ("SMM"). 10/2 A description of SMM is attached to these comments as Appendix A. Use of SMM should facilitate the rapid, cost-effective and spectrum-efficient deployment of service types within the emerging technology bands, where a wide variety of new PCS services are expected to co-exist with current point-to-point users.

As detailed in the Appendix, SMM has as its underpinning a philosophy of graceful coexistence of complementary and existing services, rather than creating a methodology based on conflict and competitive coexistence among licensees. SMM also incorporates a high degree of "future-proofing" for changes in spectrum allocation and/or services. In essence, SMM serves as a base for high-level definition of interactions between the various present and future PCS applications and service operator(s). Key parts of the SMM include:

Use of beacon control channels to effectuate a "listen-before-talk" (LBT) access protocol on all terminals using licensed/public access bands to prevent inadvertent base/mobile transmissions on occupied channels. The beacon control channel would specify "usable" channels for the area served by that base station. Use of the LBT

Northern Telecom recently presented the Spectrum Management Methodology to the relevant industry fora (including T1P1, T1E1, TR45.4 and Telocator). Following review of the comments received in response to the NPRM and development of a clearer understanding of the rules that will govern PCS, Northern Telecom will work with the appropriate standards committees and other segments of the PCS industry to promulgate the necessary details of the plan in a timely manner.

access protocol should not noticeably delay call set up time, and it would also allow sharing of the band between licensed PCS and the current point-to-point users. In addition, the beacon control channels allow different PCS operators to utilize their assigned spectrum in different manners, thereby preserving significant flexibility while also supporting roaming. Northern Telecom thus recommends the LBT access protocol be incorporated as a Commission license condition for PCS;

- Establishment of a Commission (and/or Commission-authorized third-party) database of all existing microwave transmitter and receiver sites to identify areas of potential interference and allow the base stations readily to identify the "usable" channels;
- Identification of uniquely different service categories (e.g., voice, wireless LAN (10 Mb/s), satellite), each of which are handled consistently and in an optimum manner with a common air interface (CAI) to provide full ubiquity and compatibility.

The beacon control channels permit sharing of spectrum between PCS license holders and existing point-to-point microwave licensees. Northern Telecom does not believe, however, that such an approach for coordination between PCS and current licensees represents an appropriate permanent solution for ensuring usable spectrum for licensed PCS, because the sharing between PCS and the current point-to-point licensees does create some spectral inefficiencies that would hinder the full development and expansion of PCS. While some spectral inefficiencies can be tolerated during the early stages of PCS, the anticipated demand for PCS is so great that the limited amount of spectrum to be allocated will quickly be inadequate if the spectrum cannot be fully utilized. The beacon control channels of SMM should

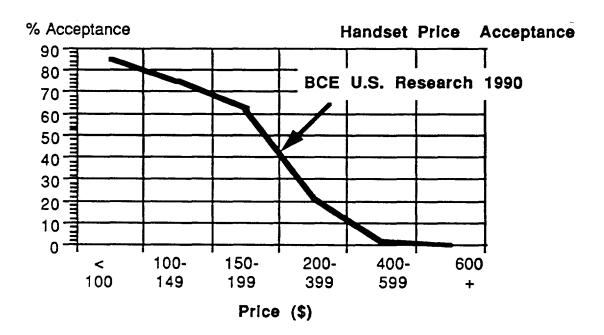
provide a smooth transition until the current point-to-point license holders can relocate to alternative suitable spectrum. In this regard, Northern Telecom urges the Commission to implement a program that allows such migration to occur in the shortest possible interval so as not to increase unduly PCS service costs or restrict the varieties of PCS applications that are deployed.

Another important element of SMM is the common air interfaces ("CAIs"). A CAI for each like service (e.g., voice, wireless LAN, etc.) will help to expand usage of PCS and increase competition, while also permitting innovation in other aspects of the services and equipment. Just as in the analog cellular market today, a consumer will be able to change service providers without having to worry whether the terminals will operate on the new system. As a further advantage, CAIs will prevent equipment from being rendered useless if a particular PCS operator goes out of business. CAIs would ensure that any other licensee could provide a similar PCS service to the end user.

In addition, the degree of standardization resulting from CAIs for PCS products and services is one of the key mechanisms by which production volumes could reach the price points that current market research shows will drive maximum market penetration. A CAI environment will encourage multiple equipment manufacturers to develop specific equipment to meet different market niches by reducing the investment recovery risk. Since they will not have to design their systems to support

multiple channelization plans, the manufacturers and service providers can focus their efforts and capital on new or unique applications.

# PCS - Price is Important



As noted earlier, a goal of the Commission in this proceeding is to develop rules for PCS that allow for the provision of the widest range of PCS services at the lowest cost to consumers. Excessive costs of providing communication services, imposed as a result of factors such as non-standard air interfaces and excessive regulation, will drive up prices and reduce the demand for the service. Northern Telecom has demonstrated previously that demand for PCS services is very

price elastic -- as prices increase, demand decreases rapidly. 11/
Thus, the Commission must consciously avoid regulatory actions
that unnecessarily drive up the cost of PCS, to ensure that the
promises of PCS are fully achieved. The use of CAIs should also
assist in those efforts to minimize cost.

Equally as important, a CAI will allow roaming amongst licensed PCS providers throughout the United States. Basic services will be supported, enabling users to log onto new systems when they enter other service areas, with the beacon control channels providing the necessary guidance (and thereby preserving for the PCS operator the flexibility to designate how it chooses to use the assigned spectrum). Such capabilities for "universal access" further the public interest by enhancing mobility, and by allowing access to emergency services (e.g., 911) even in areas covered by a PCS service provider that is not the PCS user's subscribed carrier.

Northern Telecom believes that the industry will be able to develop the necessary CAIs in a timely fashion. Industry organizations have already begun to address the requisite standards for CAIs. Telocator has forwarded documents to the appropriate standards bodies that define the requirements for CAIs. Committee T1 in conjunction with TIA's TR45.4 have initiated work on CAI standards, and have joined into a single standards committee, the Joint Technical Committee. Northern

E.g., Northern Telecom Technical Paper submitted January 9, 1992; Bell Canada Enterprises, 1990 study.

Telecom urges the Commission to monitor and support these industry activities to ensure that they are concluded in a timely fashion, but to refrain from direct involvement in the standards setting processes unless the industry efforts prove unsuccessful. Once the standards are developed by the industry, the basic elements can be incorporated into the Commission's Rules, with the remainder of the standards setting process delegated to an appropriate standards body, so that the standards can evolve over time, if necessary, without the need for a Commission rulemaking.

C. Use Of The Services In The Unlicensed Bands Will Satisfy Important Needs As Well As Drive The Demand For PCS In The Licensed Bands, But Requires Clear Spectrum For Its Use

The Commission has proposed a 20 MHz band for PCS applications that would not require a license from the Commission, including wireless PBX, cordless phones, wireless LANs and other applications. 12/ Unlicensed PCS products, especially in business environments, will allow rapid service penetration into a market segment not served by current cellular and cordless equipment. Northern Telecom believes that the productivity improvements in business resulting from the added mobility and accessibility of workers will justify the deployment of the technology. Once exposed to quality wireless telephony devices at work, consumers will also begin demanding the service

 $<sup>\</sup>frac{12}{NPRM}$  at ¶ 42.

when on the move for their personal use. Northern Telecom foresees the significant value of unlicensed services to serve as a catalyst for acceptance and deployment of licensed PCS services, and supports the Commission's proposal to allocate spectrum for unlicensed PCS applications. However, Northern Telecom believes that spectrum in addition to the 20 MHz should be allocated to unlicensed PCS operations.

There is a strong possibility that service delay and start up problems due to the lack of clear spectrum dedicated to unlicensed systems may arise. Northern Telecom does not believe that unlicensed PCS devices can share spectrum with existing microwave devices in the same locality without potentially causing interference to those current users, or without limiting the affordability, ubiquity and mobility that characterize the Commission's vision of PCS. 13/

While access control mechanisms may be used in licensed bands to avoid interference, such methods are not similarly available for unlicensed bands operations. In order to coexist with existing microwave license holders, licensed providers will be required to test for interference with incumbent microwave systems and other PCS systems, and engineer base station sites to avoid interference to the point-to-point licensees. As proposed by Northern Telecom, the licensed PCS operations will have to deploy a "listen-before-talk" mechanism to prevent interference

<sup>13/</sup> See, e.g., "Telocator Analysis of Part 16 Sharing", Telocator PCS Technical & Engineering Committee, TE/92-5-28/40R2.

from the licensed handsets by controlling their emissions. There can be no such engineering, coordination and testing restrictions on unlicensed systems, however, because they are likely to be deployed by end users who have purchased the hardware and do not possess the technical skills to engineer its installation. 14/

For unlicensed services to be commercially successful, the applications must be simple and economic to deploy by end users. In addition, the wide variety of vendors whose equipment may be installed on a customer's premise increase spectrum management complexity. A microwave system could suffer serious interference from a newly installed, unlicensed PCS system without the incumbent user knowing the location or identity of the offender. It would be difficult for the point-to-point licensee to contact the unlicensed user interfering with the fixed microwave systems so as to rectify the problem, because the unlicensed users and their locations would not be known.

Furthermore, it would be impractical for the (presumably unsophisticated) unlicensed end user to know what frequencies to avoid using in any particular geographic area, and

In some instances, it may be possible for an unlicensed PCS user to coordinate with the potentially affected point-to-point licensees. For example, some wireless PBX or wireless LAN installations by sophisticated users could be candidates for such coordination. Under those circumstances, the Commission could permit use of the unlicensed band prior to the spectrum being "cleared" through a registration or other similar procedure to ensure that the equipment is not moved to a different location. Such an approach will provide some interim relief, although it is still essential that the spectrum be cleared rapidly to allow the full range of unlicensed PCS applications to develop.

to preclude their use in the PCS device through software commands for the beacon message in the base station. Thus, a "listen-before-talk" protocol would not be effective in preventing interference to point-to-point licensees by an unlicensed PCS system. As a result, handsets and stations could broadcast on any frequency and at any location. A user could potentially turn on their handset or base station in a new location and interfere with incumbent systems.

Because of these significant potential interference problems, Northern Telecom believes that spectrum cleared of point-to-point microwave licensees is necessary for the effective use of unlicensed product. However, unlike the situation where the Commission has developed a plan for PCS licensees to assume responsibility for relocating point-to-point licensees (or avoiding interference), it would not be feasible or practical for unlicensed PCS users to clear the bands. The manufacturers of PCS equipment intended for unlicensed operations have the greatest incentive to act to clear spectrum of incumbent users, although the open access to the bands presents "free rider" Manufacturers' associations, such as WinForum, an organization of Voice and Data manufacturers interested in providing PCS products, are developing plans for clearing the Northern Telecom recommends that the Commission monitor and encourage this industry activity to develop a practical solution to this potentially thorny problem.